

Diagnosis and Treatment of Ebola Virus Disease

KCMC POST – GRADUATE SEMINAR 22nd – 24th OCTOBER 2014

THEME: INFECTIOUS DISEASES: TRENDS AND THREATS

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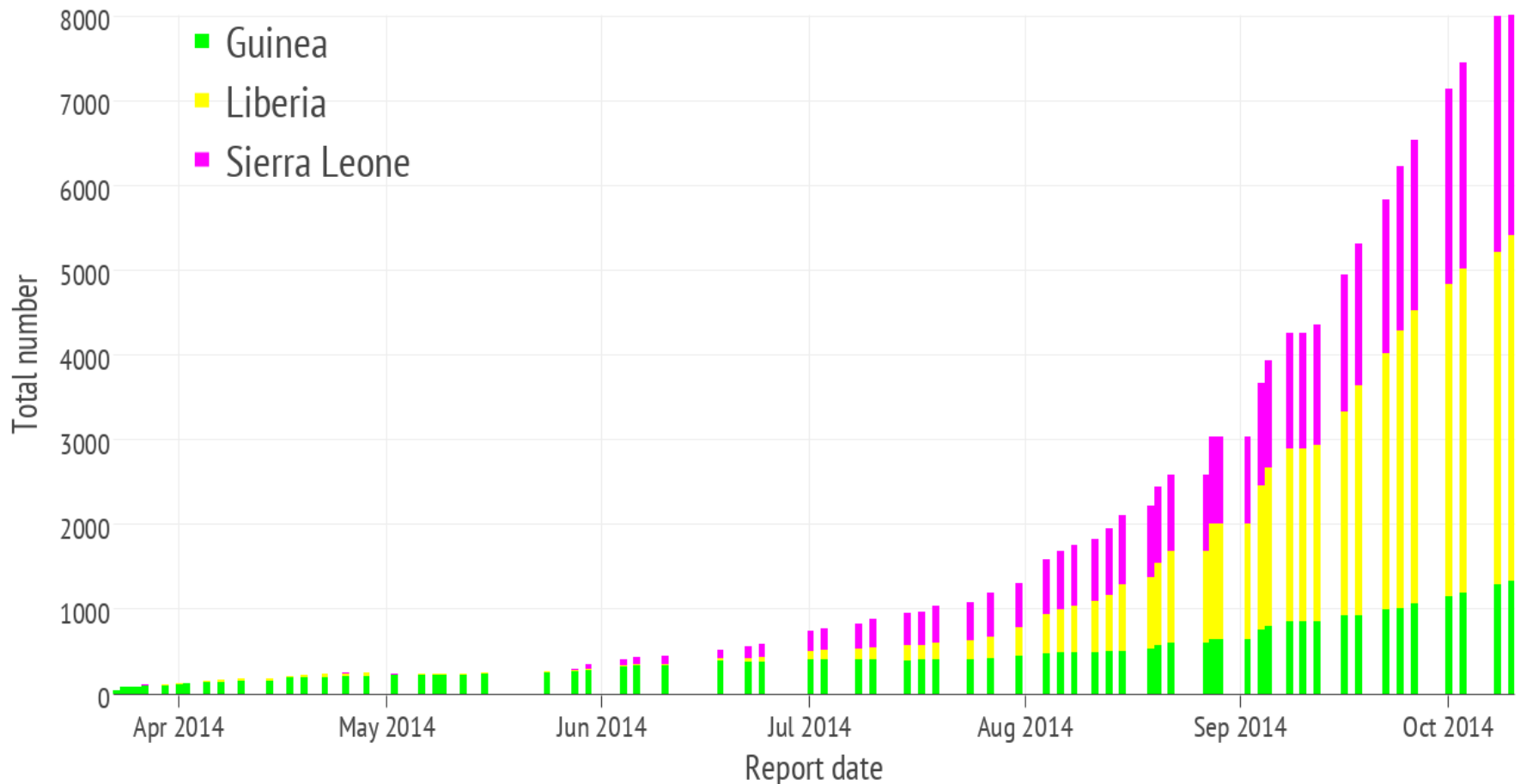


KCMUco-TUMA



8000 Cases And Counting.....??

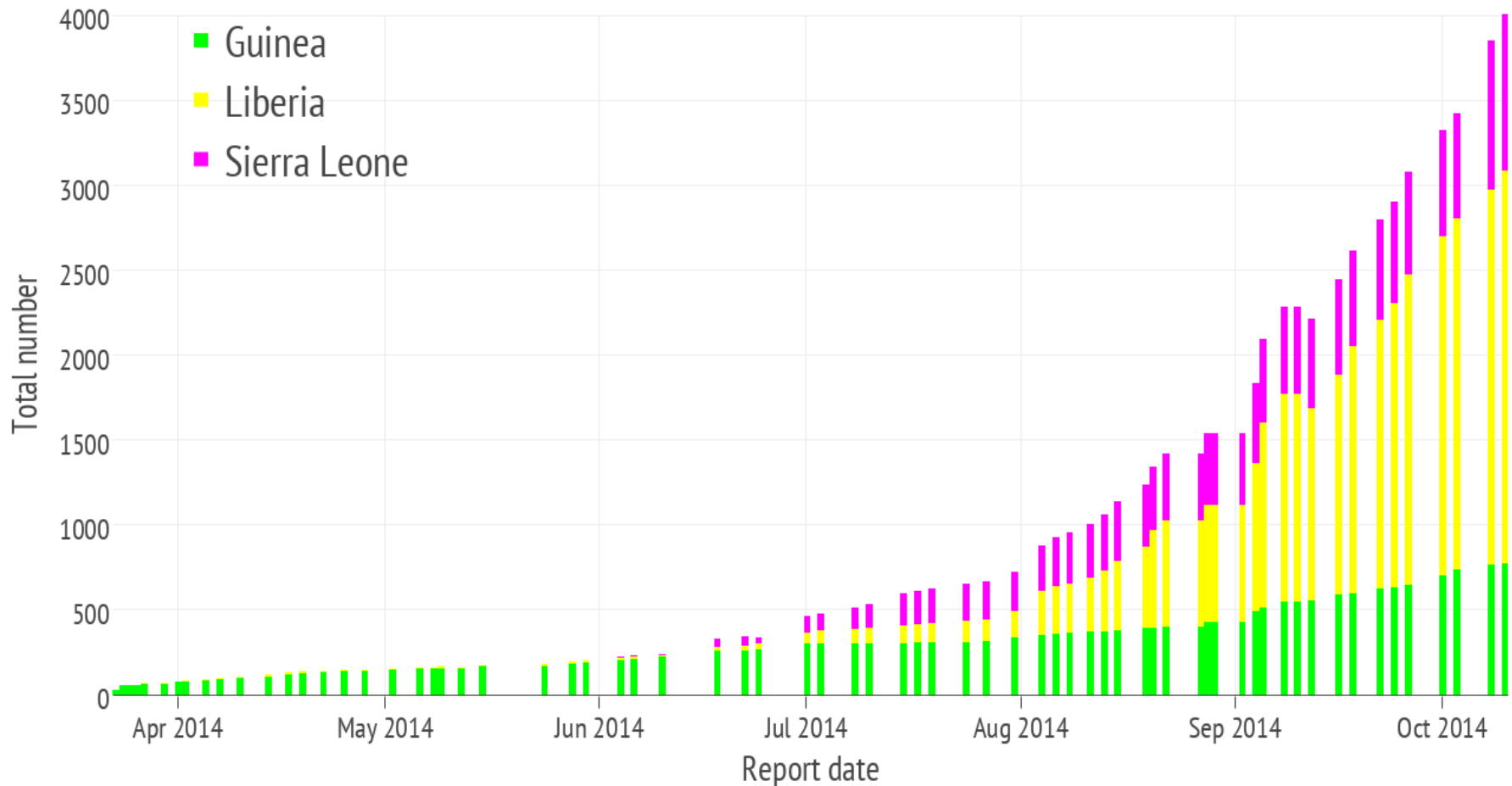
Ebola cases in West Africa



Ebola cases in West Africa (Data: WHO / Chart CC BY 4.0: JV Chamary / Source: <http://onforb.es/1sCVxE1>)

4000+ DEATH TOLL, and COUNTING!!!

Ebola deaths in West Africa



Ebola deaths in West Africa (Data: WHO / Chart CC BY 4.0: JV Chamary / Source: <http://onforb.es/1sCVxE1>)

Case Definition for Ebola Virus Disease (EVD)

- **Person Under Investigation (PUI):** A person who has both consistent symptoms and risk factors as follows:
 - ✓ Clinical criteria, fever > 38.6 degrees, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhoea, abdominal pain, or unexplained haemorrhage; **AND**
 - ✓ Epidemiologic risk factors within the past 21 days before the onset of symptoms:
 - ✓ Such as contact with blood or other body fluids or human remains of a patient known to have or suspected to have EVD
 - ✓ Residence in—or travel to—an area where EVD transmission is active
 - ✓ Direct handling of bats or non-human primates from disease-endemic areas.

Case Definition for Ebola Virus Disease (EVD) cont...

- **Confirmed Case:** A case with laboratory-confirmed diagnostic evidence of Ebola virus infection.
- **A high risk exposure includes any of the following:**
 - ✓ Percutaneous (e.g., needle stick) or mucous membrane.
 - ✓ Direct skin contact with, or exposure to blood or body fluids of EVD.
 - ✓ Processing blood or body fluids of a confirmed EVD patient without PPE.
 - ✓ Direct contact with a dead body without appropriate PPE.

Probable case

- ?direct handling of bats, rodents,
- ? Contact with primates from disease-endemic areas.
- ?residence in—or travel to—an area with EVD

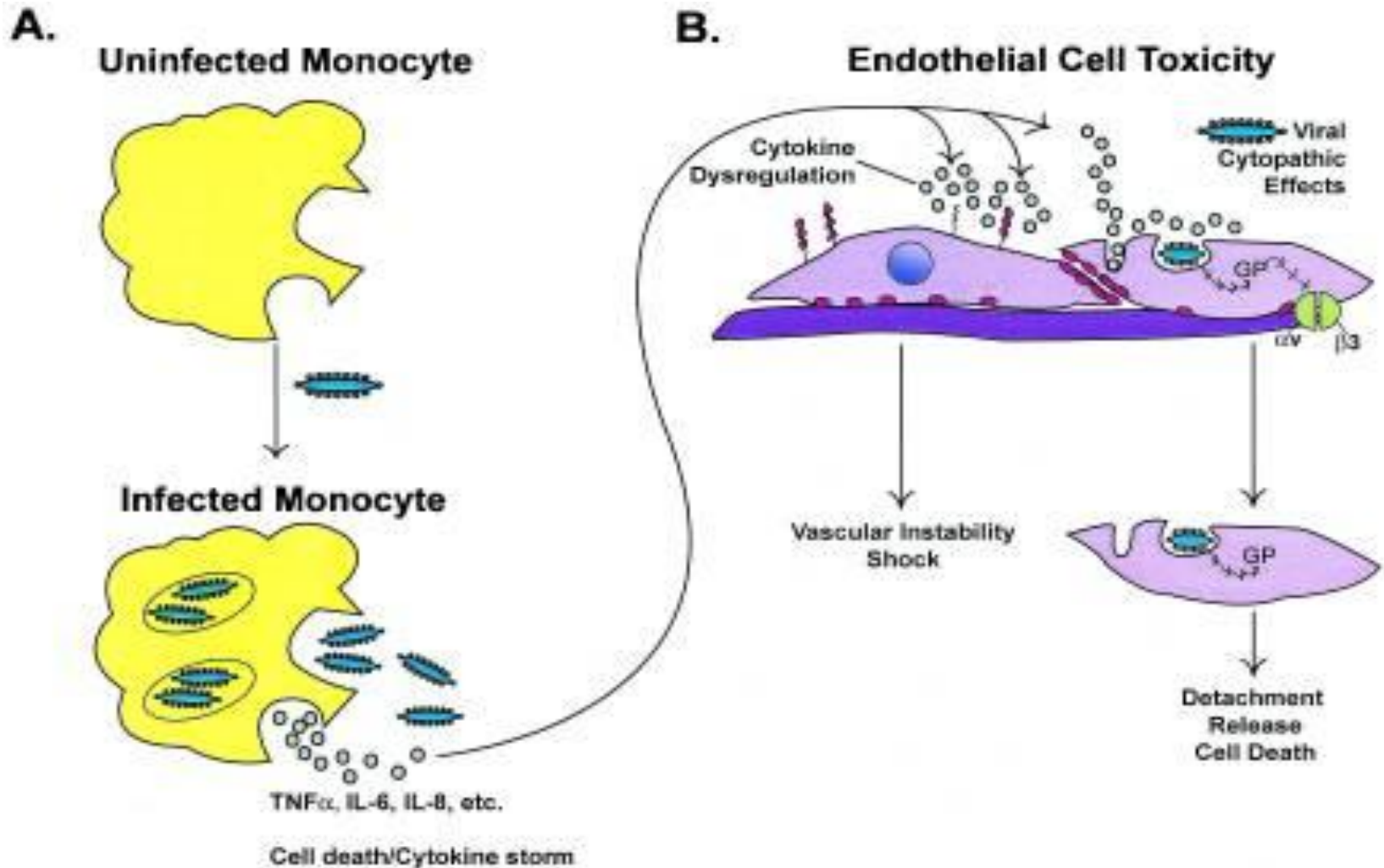


Hand shaking?

low risk exposure includes any of the following

- Household member or other casual contact with an EVD patient.
- Providing patient care or casual contact without high-risk exposure with EVD patients.

Pathophysiology of EVD



WEST AFRICA

Ebola Outbreak

Early Symptoms:

Ebola can only be spread to others after symptoms begin. Symptoms can appear from 2 to 21 days after exposure.

- **Fever**
- **Headache**
- **Diarrhea**
- **Vomiting**
- **Stomach pain**
- **Muscle pain**
- **Unexplained bleeding or bruising**



Symptoms cont...



Diagnosis is basing on clinical and laboratory



Source: Photograph provided by authors



Prof. Janusz Paweska, head of the special pathogens unit (SPU), at the National Institute for Communicable Diseases (NICD) in South Africa – the only biosafety level 4 laboratory in Africa



Workers at a biosafety-level-3 lab in Entebbe diagnosed recent cases of Ebola.



Laboratory used in diagnosis

Timeline of infection	Diagnostic test available
Within a few days after symptoms begin	ELISA testing-IgM ELISA Polymerase chain reaction (PCR) Virus isolation
Later in disease course or after recovery	IgM and IgG antibodies
Retrospectively in deceased patients	Immunohistochemistry testing PCR Virus isolation

Ebola treatment preparedness



Are we
prepared ??

Ronald Reagan UCLA Medical Centre in Los Angeles, LA USA.

On 12 August, 2014

By Fiona Macrae and Jennifer Newton



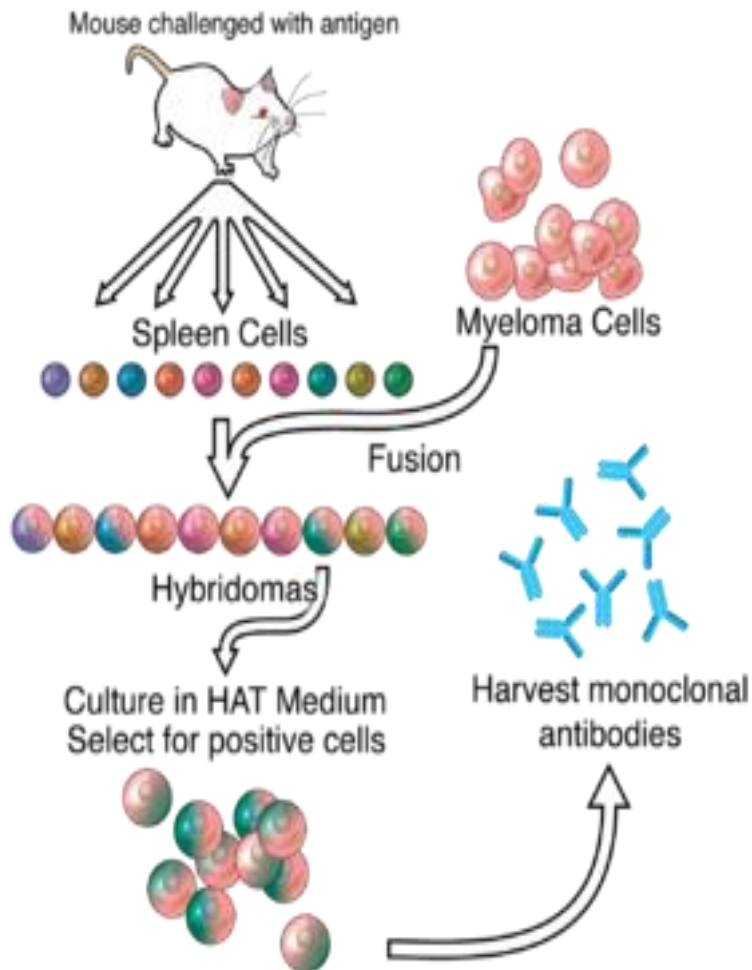
Miguel Pajares (75yrs) ready to be returned back to Spain

RIP Miguel

Ebola claims its first European victim: Spanish priest dies in Madrid five days after being flown out of Liberia
He was 'given ZMapp drug' credited with recovery of two US aid workers



Monoclonal antibodies production



- Zmapp contain three humanized monoclonal antibodies.
- Zmapp produced from tobacco plant 'Nicotiana'
- Bio-farming –genes of interest
- MB-003 and 2 ZMab
- Zmab (EBOV-GP-specific monoclonal antibodies)

Treatment cont..

- Convalescent plasma
- Brincidofovir, or CMX001, is a broad-spectrum antiviral drug (**Thomas Duncan-Dallas**)-3rd trial
- BCX-4430 that works against Ebola and Marburg viruses in rodents and Marburg in monkey (**in human???**)

[Forbes.com](#), 2014

Treatment cont...

- balancing the patient's fluids and electrolytes
- maintaining their oxygen status and blood pressure
- treating them for any complicating infections
- Experimental drugs ie from *Nicotiana*
- **Zmapp** (3 monoclonal antibodies)- **Rev Pajares died**
- **Tekmira** (TKM) -Ebola (RNA-interference)- **'clinical hold'**
- **Sarepta**- Ebola (RNA-based)

[Forbes.com](#), 2014

Management of shock in EVD

- Fluid replacement
- initially 1L RL or NS bolus, continue with RL or NS at 20 ml/kg/hr, not to exceed of 60 ml/kg in the first 2 hrs (including the initial bolus).
 - ✓ Monitor SBP, UO, mental status
- If SBP remains < 90mmHg and signs of poor perfusion continue after fluid resuscitation over the first 2 hours,
 - ✓ Add vasopressors (dopamine or epinephrine)

Fluid replacement in EVD

- At 2–6 hours, if SBP > 90 mmHg, continue fluids at 2 ml/kg/hour.
 - ✓ if the pulse is still high and there are other signs of poor perfusion, patient may still be volume-depleted and need more fluids
- Watch for signs of fluid overload
 - ↑ JVP, lung creps , peripheral edema

WHO update, 2014

Septic Shock management plan

- Give empirical IV antibiotics within the 1st hr
- Choice of antibiotics depends on
 - presence of signs of local infection
 - local disease patterns
 - availability of antibiotics.
- A good choice is ceftriaxone 2 grams daily IV.

WHO update, 2014

Supportive management

SYMPTOMS	TREATMENT
Fever (>38.0 °C)	<i>Paracetamol</i>
Acute significant bleeding/moderate to severe pallor	Transfuse with whole blood
Pain	<i>Paracetamol</i> (if mild) or <i>morphine</i> (if moderate and severe)
Respiratory distress	Oxygen: titrate to SpO ₂ ≥90% If SpO ₂ < 90%, start adult on 5L/min
Vomiting	- <i>chlorpromazine</i> 25-50 mg, 6 hrly IM or orally - <i>metoclopramide</i> 10 mg IV/ po 8 hrly
Convulsions	Diazepam 20mg IV or rectally

Prevention cont...

- WHO and CDC developed manual
 - “Infection Control for Viral Hemorrhagic Fevers In the African Health Care Setting”
- Anyone suspected of having a VHF must use a chemical toilet
- Disinfect and dispose of instruments
 - ✓ Use a 0.5% solution of sodium hypochlorite (1:10 dilution of bleach)

Prevention cont...



Continuously flow hand washing

- Reduce unnecessary contacts with suspected Ebola patients.
- Special register for suspected cases, deaths and contacts
- HCW and logistical burial teams should supervise and assist in the burial of dead bodies

References

- **Nancy Sullivan et al 2003**
- www.cdc.gov/vhf/ebola/outbreaks/ *accessed on 19 October 2014.*
- www.who.int/csr/disease/ebola/en *accessed on 21st October 2014.*
- www.bbc.co.uk/swahili *accessed on 22nd October 2014.*
- WWW.WHO.Ebola/outbreak/accessed *on 22nd October 2014*
- Ebola trends around the world. *The Democratic Republic of Congo outbreak is unrelated to the epidemic in West Africa, which has spread to Nigeria, Senegal, Spain and the US (Data: WHO / Chart CC BY 4.0: JV Chamary / Source: <http://onforb.es/1sCVxE1>) *accessed on 21st October 2014*



THANK YOU FOR YOUR ATTENTION